What is claimed is:

1. In a steering control device equipped with: a turning mechanism including a turning actuator driving a position-controllable turning shaft; and a steering angle sensor detecting a steering angle θ of a steering wheel,

a steering control device comprises:

a turning displacement sensor detecting a turning displacement X ($-X_E \leq X \leq +X_E$) in said turning mechanism; and

means for calculating a turning instruction value calculating an instruction value for a turning displacement in said turning mechanism based on said steering angle θ;

wherein:

said turning instruction value calculating means includes means for generating hysteresis characteristics calculating, in exceptional situations where an absolute value $|\theta|$ of said steering angle θ exceeds a predetermined threshold value θ_E corresponding to an upper limit X_E of said turning displacement X, said instruction value X_n based on: a vertical axis coordinate corresponding to said steering angle θ on a predetermined hysteresis loop with one side being a section of a line $X_n = +/- X_E$ on a θ-X_n plane; and a steering direction (steering direction/restoring direction) of said steering wheel.

2. A steering control device as described in claim 1 wherein a steering mechanism including said steering wheel and said turning mechanism are mechanically separated, and an electrical coupling mechanism substitutes for a connecting mechanism connecting said steering mechanism and said turning mechanism.

3. A steering control device as described in claim 1 further comprising means for setting an endpoint setting a target coordinate for an endpoint P_O that closes said hysteresis loop.

4. A steering control device as described in claim 2 further comprising means for setting an endpoint setting a target coordinate for an endpoint P_O that closes said hysteresis loop.

5. A steering control device as described in claim 3 wherein said endpoint setting means includes means for varying a target point dynamically varying said target coordinate for said endpoint P_O based on a steering velocity ω (= $d\theta/dt$), a steering torque τ, said steering angle θ, said steering direction, or an automobile velocity v.

6. A steering control device as described in claim 4 wherein said endpoint setting means includes means for varying a target point dynamically varying said target coordinate for said endpoint P_O based on a steering velocity ω (= $d\theta/dt$), a steering torque τ, said steering angle θ, said steering direction, or an automobile velocity v.

7. A steering control device as described in claim 1 wherein, using a function $f(\theta)$ of said steering angle θ, symmetrical around the origin, and a correction gain G ($0 < G \leq 1$), said hysteresis loop on said θ-X_n plane is formed as a closed curve from said line $X_n = +/- X_E$, a curve $X_n = f(\theta)$, and a curve $X_n = Gf(\theta)$.

8. A steering control device as described in claim 2 wherein, using a function $f(\theta)$ of said steering angle θ, symmetrical around the origin, and a correction gain G ($0 < G \leq 1$), said hysteresis loop on said θ-X_n plane is formed as a closed curve from said line $X_n = +/- X_E$, a curve $X_n = f(\theta)$, and a curve $X_n = Gf(\theta)$.

9. A steering control device as described in claim 3 wherein, using a function $f(\theta)$ of said steering angle θ, symmetrical around the origin, and a correction gain G ($0 < G \leq 1$), said hysteresis loop on said θ-X_n plane is formed as a closed curve from said line $X_n = +/- X_E$, a curve $X_n = f(\theta)$, and a curve $X_n = Gf(\theta)$.

10. A steering control device as described in claim 4 wherein, using a function $f(\theta)$ of said steering angle θ, symmetrical around the origin, and a correction gain G ($0 < G \leq 1$), said hysteresis loop on said θ-X_n plane is formed as a closed curve from said line $X_n = +/- X_E$, a curve $X_n = f(\theta)$, and a curve $X_n = Gf(\theta)$.

11. A steering control device as described in claim 5 wherein, using a function $f(\theta)$ of said steering angle θ, symmetrical around the origin, and a correction gain G ($0 < G \leq 1$), said hysteresis loop on said θ-X_n plane is formed as a closed curve from said line $X_n = +/- X_E$, a curve $X_n = f(\theta)$, and a curve $X_n = Gf(\theta)$.

12. A steering control device as described in claim 6 wherein, using a function $f(\theta)$ of said steering angle θ, symmetrical around the origin, and a correction gain G ($0 < G \leq 1$), said hysteresis loop on said θ-X_n plane is formed as a closed curve from said line $X_n = +/- X_E$, a curve $X_n = f(\theta)$, and a curve $X_n = Gf(\theta)$.

13. A steering control device as described in claim 7 further comprising means for calculating correction gain calculating a value for said correction gain G based on said upper limit X_E and said function $f(\theta)$.

14. A steering control device as described in claim 8 further comprising means for calculating correction gain calculating a value for said correction gain G based on said upper limit X_E and said function $f(\theta)$.

15. A steering control device as described in claim 9 further comprising means for calculating correction gain calculating a value for said correction gain G based on said upper limit X_E and said function $f(\theta)$.

16. A steering control device as described in claim 10 further comprising means for calculating correction gain calculating a value for said correction gain G based on said

upper limit X_E and said function $f(\theta)$.

17. A steering control device as described in claim 11 further comprising means for calculating correction gain calculating a value for said correction gain G based on said upper limit X_E and said function $f(\theta)$.

18. A steering control device as described in claim 12 further comprising means for calculating correction gain calculating a value for said correction gain G based on said upper limit X_E and said function $f(\theta)$.

19. A steering control device as described in claim 7 further comprising means for asymptote normalization monotonically increasing said correction gain G ($0 < G \leq 1$) in a dynamic manner based on a steering amount S, a steering status, a turning amount Z, or a turning status after initiation of restorative steering having as a starting point said line $X_n = +/- X_E$.

20. A steering control device as described in claim 13 further comprising means for asymptote normalization monotonically increasing said correction gain G ($0 < G \leq 1$) in a dynamic manner based on a steering amount S, a steering status, a turning amount Z, or a turning status after initiation of restorative steering having as a starting point said line $X_n = +/- X_E$.

21. A steering control device as described in claim 19 wherein said asymptote normalizing means includes means for varying an asymptote rate using a steering velocity ω (= $d\theta/dt$), a steering torque τ, said steering angle θ, said steering direction, or an automobile velocity v, in order to dynamically change an asymptote rate A ($\equiv dG/dS$) for said steering amount S of said correction gain G or an asymptote rate B ($\equiv dG/dZ$) for said turning amount Z of said correction gain G when said correction gain G ($0 < G \leq 1$) is being monotonically increased in a dynamic manner.

22. A steering control device as described in claim 20 wherein said asymptote normalizing means includes means for varying an asymptote rate using a steering velocity ω (= $d\theta/dt$), a steering torque τ, said steering angle θ, said steering direction, or an automobile velocity v, in order to dynamically change an asymptote rate A ($\equiv dG/dS$) for said steering amount S of said correction gain G or an asymptote rate B ($\equiv dG/dZ$) for said turning amount Z of said correction gain G when said correction gain G ($0 < G \leq 1$) is being monotonically increased in a dynamic manner.

23. A steering control device as described in claim 1 further comprising means for varying a steering angle threshold dynamically changing upper and lower limits of a predetermined tolerance range ($-\theta_E \leq \theta \leq \theta_E$) of said steering angle θ based on an automobile velocity v.

24. A steering control device as described in claim 2 further comprising means for varying a steering angle threshold dynamically changing upper and lower limits of a predetermined tolerance range ($-\theta_E \leq \theta \leq \theta_E$) of said steering angle θ based on an automobile velocity v.

25. A steering control device as described in claim 3 further comprising means for varying a steering angle threshold dynamically changing upper and lower limits of a predetermined tolerance range ($-\theta_E \leq \theta \leq \theta_E$) of said steering angle θ based on an automobile velocity v.

26. A steering control device as described in claim 5 further comprising means for varying a steering angle threshold dynamically changing upper and lower limits of a predetermined tolerance range ($-\theta_E \leq \theta \leq \theta_E$) of said steering angle θ based on an automobile velocity v.

27. A steering control device as described in claim 7 further comprising means for

varying a steering angle threshold dynamically changing upper and lower limits of a predetermined tolerance range ($-\theta_E \leq \theta \leq \theta_E$) of said steering angle θ based on an automobile velocity v.

28. A steering control device as described in claim 13 further comprising means for varying a steering angle threshold dynamically changing upper and lower limits of a predetermined tolerance range ($-\theta_E \leq \theta \leq \theta_E$) of said steering angle θ based on an automobile velocity v.

29. A steering control device as described in claim 19 further comprising means for varying a steering angle threshold dynamically changing upper and lower limits of a predetermined tolerance range ($-\theta_E \leq \theta \leq \theta_E$) of said steering angle θ based on an automobile velocity v.

30. A steering control device as described in claim 22 further comprising means for varying a steering angle threshold dynamically changing upper and lower limits of a predetermined tolerance range ($-\theta_E \leq \theta \leq \theta_E$) of said steering angle θ based on an automobile velocity v.

31. A steering control device as described claim 1 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said steering angle θ, a virtual abutment resistance restricting said steering angle θ from exceeding a predetermined tolerance range ($-\theta_R \leq \theta \leq \theta_E$), based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.

32. A steering control device as described claim 2 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said

steering angle θ, a virtual abutment resistance restricting said steering angle θ from exceeding a predetermined tolerance range ($-\theta_R \leq \theta \leq \theta_E$), based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.

33. A steering control device as described claim 3 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said steering angle θ, a virtual abutment resistance restricting said steering angle θ from exceeding a predetermined tolerance range ($-\theta_R \leq \theta \leq \theta_E$), based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.

34. A steering control device as described claim 5 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said steering angle θ, a virtual abutment resistance restricting said steering angle θ from exceeding a predetermined tolerance range ($-\theta_R \leq \theta \leq \theta_E$), based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.

35. A steering control device as described claim 7 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said steering angle θ, a virtual abutment resistance restricting said steering angle θ from exceeding a predetermined tolerance range ($-\theta_R \leq \theta \leq \theta_E$), based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.

36. A steering control device as described claim 13 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said steering angle θ, a virtual abutment resistance restricting said steering angle θ from

exceeding a predetermined tolerance range $(-\theta_R \leq \theta \leq \theta_E)$, based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.

37. A steering control device as described claim 19 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said steering angle θ, a virtual abutment resistance restricting said steering angle θ from exceeding a predetermined tolerance range $(-\theta_R \leq \theta \leq \theta_E)$, based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.

38. A steering control device as described claim 22 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said steering angle θ, a virtual abutment resistance restricting said steering angle θ from exceeding a predetermined tolerance range $(-\theta_R \leq \theta \leq \theta_E)$, based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.

39. A steering control device as described claim 23 wherein said steering mechanism includes means for generating endpoint reactions generating, at a vicinity of an upper limit position θ_E of said steering angle θ and at a vicinity of a lower limit position $-\theta_E$ of said steering angle θ, a virtual abutment resistance restricting said steering angle θ from exceeding a predetermined tolerance range $(-\theta_R \leq \theta \leq \theta_E)$, based on said steering angle θ, said turning displacement X, or an instruction value X_n for said turning displacement X.